Preliminary Data Report for Stormwater Runoff Samples Collected in Water Canyon At Below State Route 4 on August 18, 2000

Two precipitation events occurred over the eastern Pajarito Plateau on August 18, 2000, one in the early morning hours and another in the afternoon. The TA-54 meteorological station recorded 0.26 inches by 02:15 am and 0.36 inches between 3:30 and 4:30 p.m., and daily total of 1.72 inches. The TA-6 meteorological station recorded 0.15 inches by 03:00 and a total of 0.61 inches for the day. The TA-49 station recorded 0.18 inches during the early morning hours and a daily total of 1.18 inches. Figure 1 shows the pattern of total daily precipitation recorded on the Pajarito Plateau on August 18.

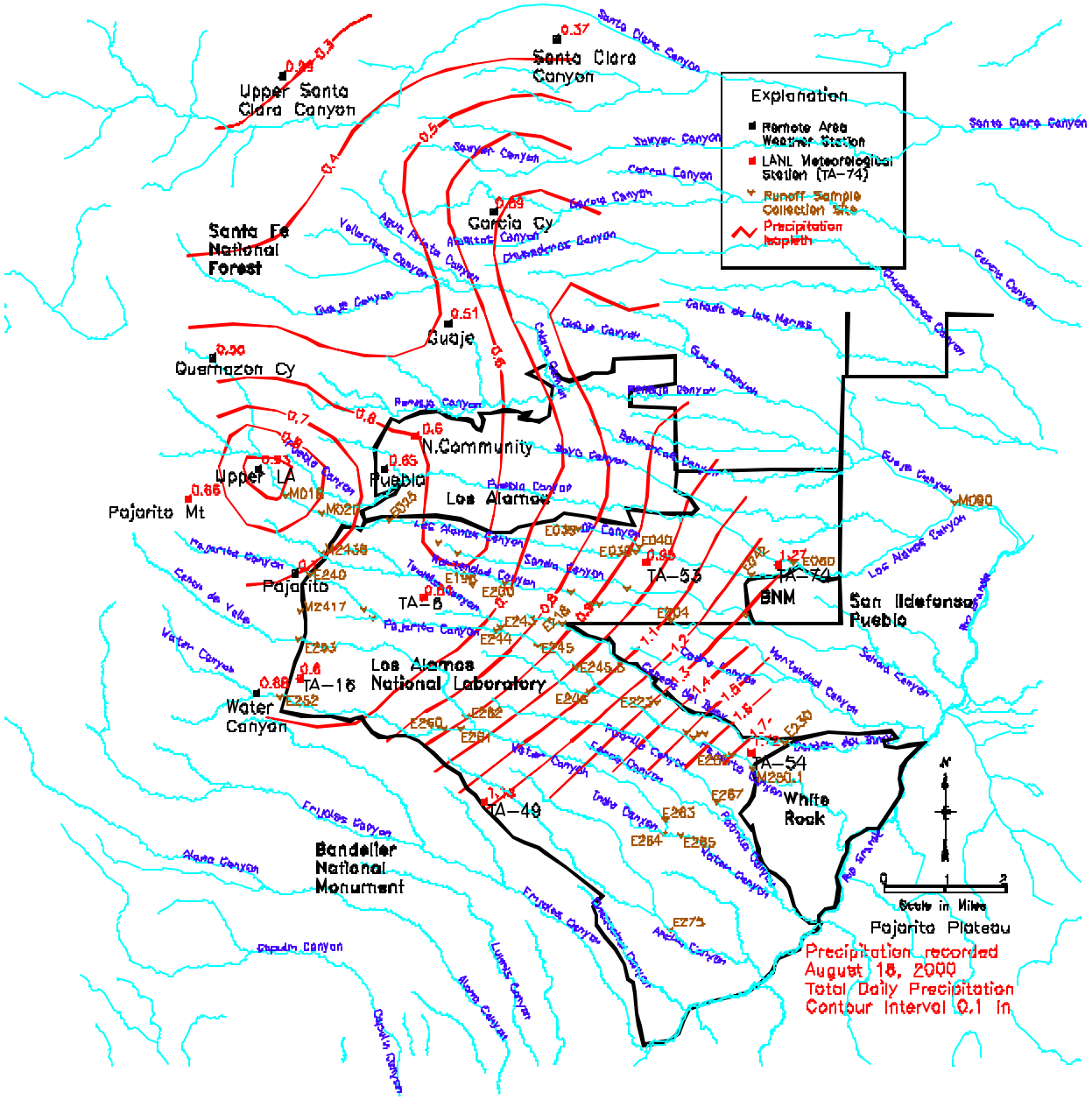


Figure 1. Precipitation Recorded at Meteorological Stations on the Pajarito Plateau on the Morning of August 18, 2000.

Flow associated with the precipitation events during the day was recorded at stream gage E265 in Water Canyon below State Route 4. The average hourly flow at this stream gage for August 18 is shown on Figure 2. The peak flow volume of 0.19 cfs associated with the morning stormwater sampling event was recorded at 10:25 in the morning of August 18.

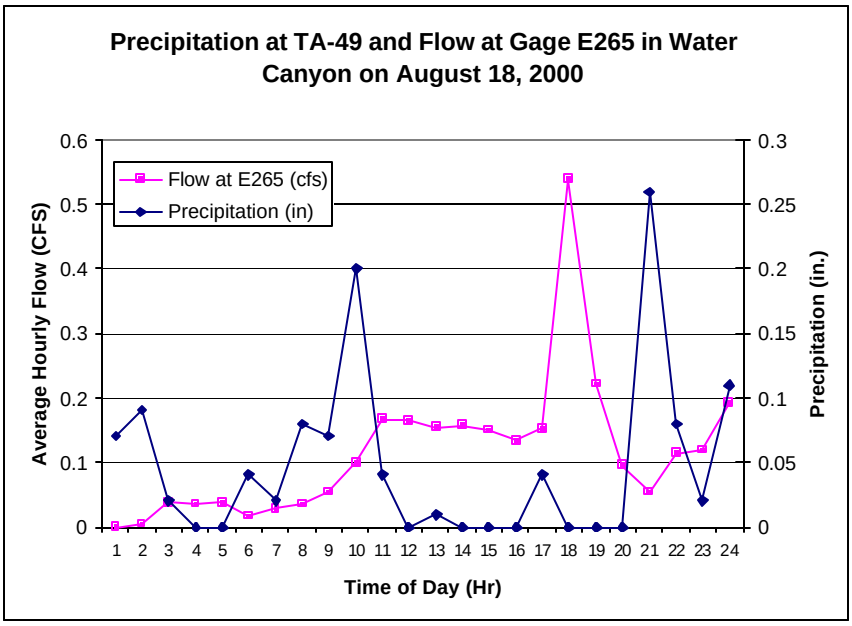


Figure 2. Precipitation at TA-49 and Flow measured at stream gage E265 in Water Canyon on August 18, 2000

Automated stormwater runoff samples were collected at stream gage E265 at 09:05 during the morning runoff event. Unfiltered and filtered samples were collected for analysis. The samples were sent to General Engineering Laboratories, Inc. in Charleston, South Carolina for analysis for radionuclides, general inorganic constituents, metals, SVOCs, HE, and Furans/Dioxins.

Preliminary results of the available analyses for the samples collected during the afternoon storm event are shown in Table 1. Also shown on Table 1 are the maximum values of constituents that have been recorded previous to the Cerro Grande Fire in filtered and unfiltered stormwater runoff at LANL (1995 through 1999), and the DOE Public Dose Derived Concentration Guides (DCGs), for comparison purposes. Results of gamma spectroscopy are reported only for Cs-137 and other radionuclides that were detected in concentrations above the laboratory method detection limit.

The unfiltered runoff samples collected on August 18, 2000 contained total suspended solids (TSS) ranging from 289 to 16000 mg/L. Based on the suspended sediment concentration and the activity of the unfiltered and filtered water samples, the concentrations of the radionuclides in the suspended sediment fraction of the runoff samples was calculated. These calculated values are also shown on Table 1.

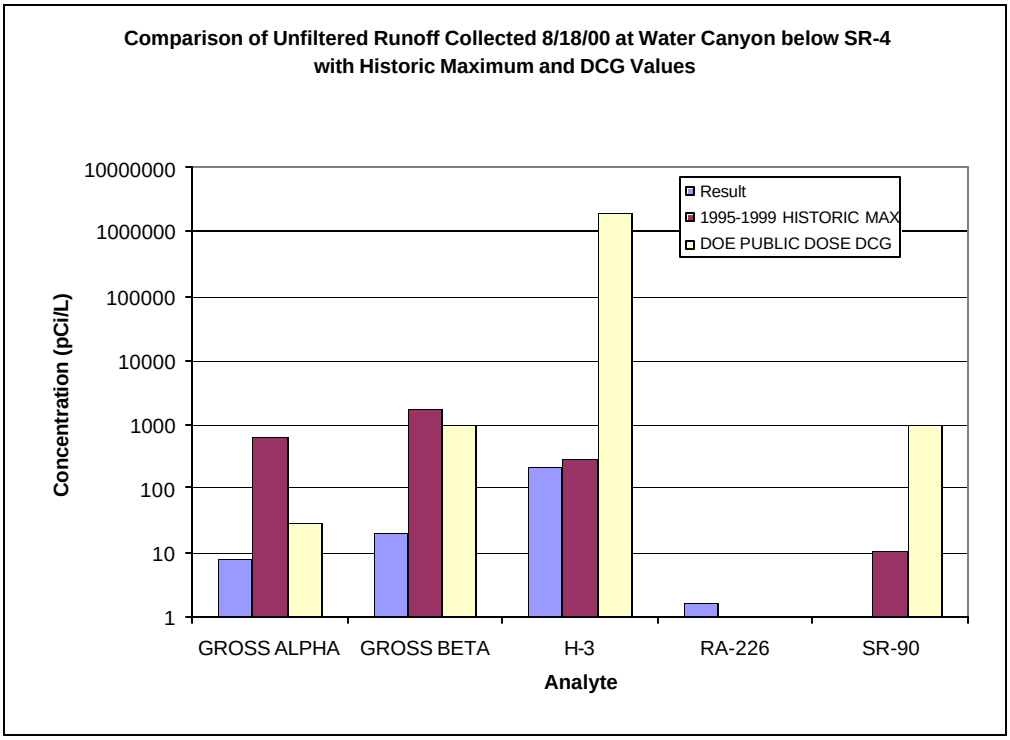
The background values (BVs) that have been determined for stream sediments at Los Alamos National Laboratory (Ryti et al. 1998) are also shown on Table 1. The BVs for stream sediments are provided as a comparison for the results of the calculated activities of radionuclides in the suspended sediment fraction of the runoff samples. Suspended sediments in runoff samples are typically finer grained than stream sediment samples; radionuclides have been found to be preferentially located in finer grained sediments, so direct comparison of the suspended sediment fraction of runoff samples with stream sediment BVs may not be appropriate, but are provided here for reference and comparison.

A summary of the preliminary results of the analyses of runoff collected during the afternoon storm event is shown in Figure 2. The results are compared graphically with the historic maximum values obtained for unfiltered runoff and the DOE DCGs. The preliminary results of the analyses for radionuclides in the stormwater runoff samples collected on August 18, 2000 are below historic maximum values and DOE DCGs.

The calculated suspended sediment concentrations with comparison to the BVs for sediments are also shown in Figure 2. The calculated values are below the BV for Sr-90 and Ra-226; BVs for other available radionuclides have not been determined.

References

Ryti, R. T., P. A. Longmire, D. E. Broxton, S. L. Reneau, and E. V. McDonald, September 1998, “Inorganic and Radionuclide Background Data for Soils, Sediments and Bandelier Tuff at Los Alamos National Laboratory,” Los Alamos National Laboratory Report LA-UR-98-4847. (Ryti et al. 1998, 59730)



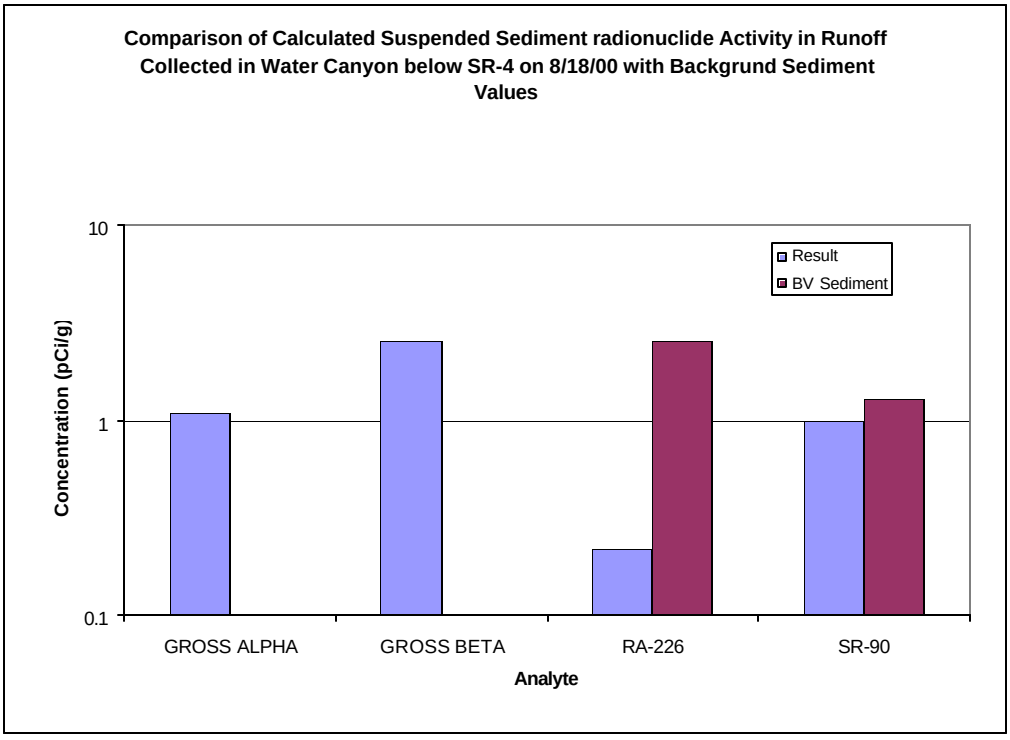


Figure 3. Comparison of runoff collected on 8/18/00 in Water Canyon with Historic Maximum, DCG Values, and Background Values for Sediment

Table 1

RADIOACTIVE SCREENING MEASUREMENTS IN STORMWATER RUNOFF IN WATER CANYON AT STATE ROUTE 4 FROM AUGUST 18, 2000 RUNOFF EVENT

DRAFT: DATA ARE PRELIMINARY

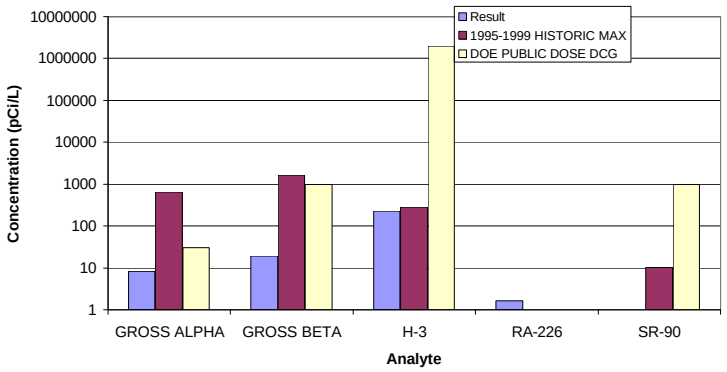
Canyon	Location	Sample ID	Lab Sample ID	Collection Date	F/UF	Collection Method	Analyte	Result	Units	TPU (pCi/L)	DL	METHOD	QUALIFIER	COMMENT	1995-1999 HISTORIC MAX	DOE PUBLIC DOSE DCG
Water	Water Canyon below SR-4	GS00085E265	30003007	18-Aug-00	UF	G	GROSS ALPHA	8.27	pCi/L	1.93	0.985	GFPC			640.8	30
Water	Water Canyon below SR-4	GS00085E265	30003007	18-Aug-00	UF	G	GROSS BETA	19.2	pCi/L	1.41	1.49	GFPC			1637	1000
Water	Water Canyon below SR-4	GS00085E265	30003007	18-Aug-00	UF	G	H-3	223	pCi/L	117	374	LSC			281	2000000
Water	Water Canyon below SR-4	GS00085E265	30095001	18-Aug-00	UF	G	RA-226	1.63	pCi/L	0.307	0.158	LUCAS CELL				
Water	Water Canyon below SR-4	GS00085E265	30095001	18-Aug-00	UF	G	SR-90	1.01	pCi/L	0.186	0.238	GFPC			10.312	1000
Water	Water Canyon below SR-4	GF00085E265	30095002	18-Aug-00	F	G	SR-90	1.05	pCi/L	0.327	0.509	GFPC		F>UF	50.9	1000
Water	Water Canyon below SR-4	GS00085E265	30099001	18-Aug-00	UF	G	CN AMEN	5.81	ug/L		2.76	EPA 335.1				
Water	Water Canyon below SR-4	GS00085E265	30099001	18-Aug-00	UF	G	CN TOT	6.61	ug/L		2.76	EPA 335.3				
Water	Water Canyon below SR-4	GS00085E265	30099001	18-Aug-00	UF	G	SP COND	102	uS/cm		1	EPA 120.1				
Water	Water Canyon below SR-4	GS00085E265	30099001	18-Aug-00	UF	G	TDS	138	mg/L		6.29	EPA 160.1		AVERAGE OF 2		
Water	Water Canyon below SR-4	GS00085E265	30003004	18-Aug-00	UF	G	TSS	13400	mg/L		35	EPA 160.2		AVERAGE OF 2		
Water	Water Canyon below SR-4	GS00085E265	30003003	18-Aug-00	UF	G	TSS	16000	mg/L		35	EPA 160.2		AVERAGE OF 2		
Water	Water Canyon below SR-4	GS00085E265	30003002	18-Aug-00	UF	G	TSS	339	mg/L		6.99	EPA 160.2		AVERAGE OF 2		
Water	Water Canyon below SR-4	GS00085E265	30003001	18-Aug-00	UF	G	TSS	289	mg/L		6.99	EPA 160.2		AVERAGE OF 2		
							AVG TSS	7507								

Calculated Suspended Sediment Concentrations of Radionuclides

Canyon	Location	Sample ID	Lab Sample ID	Collection Date	F/UF	Collection Method	Analyte	Result	Units	TPU (pCi/L)		METHOD	QUALIFIER	COMMENT	BV Sediment	Ratio Result to BV
Water	Water Canyon below SR-4	GS00085E265		08/18/00	UF	Calculated	GROSS ALPHA	1.102	pCi/g	0.257		GFPC				
Water	Water Canyon below SR-4	GS00085E265		08/18/00	UF	Calculated	GROSS BETA	2.558	pCi/g	0.188		GFPC				
Water	Water Canyon below SR-4	GS00085E265		08/18/00	UF	Calculated	RA-226	0.217	pCi/g	15.585		LUCAS CELL			2.59	0.08
Water	Water Canyon below SR-4	GS00085E265		08/18/00	UF	Calculated	SR-90	-0.005	pCi/g	0.068		GFPC		F>UF	1.3	-0.004

A or M: Automated or Manual (Grab) Sample
F/UF: filtered/unfiltered
Uncert.: 1 Stand. Dev.uncertainty in result
MDA or MDC: analytical method detection limit
TPU: Total Propogated Uncertainty
DUP: Laboratory Duplicate
DL = Detection Limit
RL = Reporting Limit
BV = Background Value (95/95 UTL)

Comparison of Unfiltered Runoff Collected 8/18/00 at Water Canyon below SR-4 with Historic Maximum and DCG Values



Comparison of Calculated Suspended Sediment radionuclide Activity in Runoff Collected in Water Canyon below SR-4 on 8/18/00 with Backgrund Sediment Values